# CHAPTER 4

# GRADUATE DEGREES

## Overview

Trends in attainment of master's and doctoral degrees follow the same pattern seen with bachelor's degrees and graduate enrollment: That is, both the numbers and percentages of women and minorities earning master's degrees and doctorates in science and engineering have increased over time. Detailed data on science and engineering graduate degrees earned by women are available from 1966 to 1996 for master's degrees and from 1966 to 1997 for doctorates. For racial/ethnic groups, comparable annual data are only available as far back as 1989 for master's degrees and 1975 for doctorates.[1]

## Master's degrees

The number of master's degrees awarded in science and engineering between 1966 and 1996 more than doubled, increasing from 41,049 to 95,313, but account for a lower percentage of all master's degrees. (See appendix table 4-1.) Science and engineering degrees accounted for 23 percent of all master's degrees awarded in 1996, compared with 29 percent in 1966.

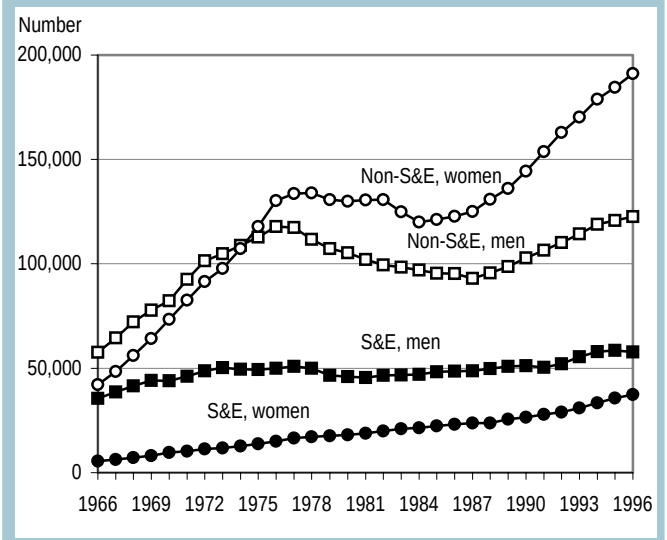
### Women

In science and engineering fields, both the number of women earning master's degrees and their proportion of the total have risen steadily over the past 30 years. In 1966, women earned 5,469 or 13 percent of the science and engineering master's degrees awarded. (See appendix table 4-2.) By 1996, they earned 37,453, or 39 percent. In contrast, the numbers of master's degrees earned by men in science and engineering remained relatively constant from the early 1970s through the early 1990s at around 50,000 degrees per year; this figure has risen only slightly since then. (See figure 4-1.)

Women earn a smaller percentage of master's degrees than of bachelor's degrees awarded in science and engineering. In 1996, when women earned 39 percent of the master's degrees awarded in science and engineering, they also received 47 percent of the bachelor's degrees in science and engineering. (See appendix tables 2-6 and 4-3.) By contrast, in non-science and -engineering fields,

Figure 4-1.

**Master's degrees awarded in science and engineering (S&E) fields and in non-S&E fields, by sex: 1966–96**




**SOURCE:** Tabulations by National Science Foundation/Division of Science Resources Studies; data from U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey.

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[1] Data on the race/ethnicity of bachelor's and master's degree recipients were collected biennially by the National Center for Education Statistics from 1977 to 1989 and annually thereafter. The data were collected only at the broad field level until 1995. Because of changes in field taxonomy in 1985, data on bachelor's and master's degrees by race/ethnicity and field from 1985 on are not comparable to earlier data. Data on the race/ethnicity of doctoral degree recipients were first collected in the Survey of Earned Doctorates in 1973. Data for 1973 and 1974 are excluded from this report because they included a large number of doctorate recipients of "unknown" race/ethnicity.

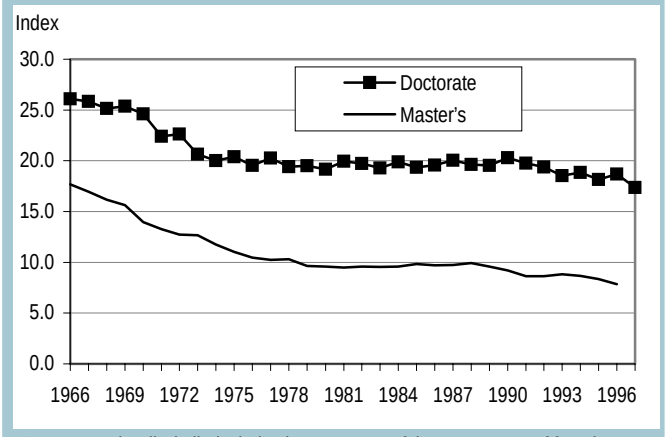
women earn about the same percentage of master's degrees as they do of bachelor's degrees: Women received 59 percent of the bachelor's degrees and 61 percent of the master's degrees awarded in non-science and -engineering fields in 1996. (See appendix tables 2-6 and 4-3.)

By field, women earned the highest percentage of science and engineering master's degrees in psychology (72 percent), the social sciences (50 percent), and the biological/agricultural sciences (49 percent); they received their lowest percentage of master's degrees in engineering (17 percent). (See appendix table 4-3.) Although the number and percentage of master's degrees awarded to women in many of these fields have been increasing, this is not the case in the fields of mathematics and computer science, where their share of total master's awards has changed little since the late 1980s.

A dissimilarity index was constructed to measure the amount of similarity or dissimilarity in the distributions of men and women by master's degree field.[2] An examination of trends in the dissimilarity index shows that the master's degree field distributions of men and women have become more similar over the past 30 years. In 1966, the dissimilarity index was 17.7, indicating that 17.7 percent of women would have to switch their master's degree field to match the distribution of fields of male master's degree recipients. (See appendix table 4-2.) By 1996, the dissimilarity index was 7.8. (See figure 4-2.)

Figure 4-2.

**Index of dissimilarity of field of master's and doctoral degrees in science and engineering, by sex: 1966–97**




**NOTE:** The dissimilarity index is a measure of the percentage of female degree recipients who would need to switch fields of study to match the percentage distribution of male degree recipients. The index is calculated as the sum of the absolute difference between the percentage of female degree recipients earning degrees in each field and the percentage of male degree recipients earning degrees in each field divided by 2.

**SOURCES:** Tabulations by National Science Foundation/Division of Science Resources Studies; data on master's degrees from U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey. Data on doctorate degrees from National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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## Minorities (U.S. citizens and permanent residents only)

In 1996, 360,682 master's degrees were awarded to U.S. citizens and permanent residents, 68,151—19 percent—of them in science and engineering. (See appendix tables 4-4 and 4-5.) More than one-third of all master's degrees awarded to Asians were in science and engineering in 1996. In contrast, 14 percent of all master's degrees awarded to blacks and 18 percent of all master's degrees awarded to whites, Hispanics, and American Indians were in science and engineering. (See text table 4-1.)

A dissimilarity index was constructed to measure the amount of similarity or dissimilarity in the distributions of racial/ethnic groups by master's degree field.[3] The index is highest for Asians—18.8 percent of Asians would have to switch their master's degree field to match the field distribution of their white counterparts. (See appendix table 4-4.) The index is lowest for Hispanics—1.5 percent would have to switch their master's degree field to match

[2] The dissimilarity index is a measure of the percentage of women master's degree recipients who would need to switch fields of study to match the field distribution of men students receiving master's degrees. The index is calculated as the sum of the absolute difference between the percentages of male and female degree recipients in each field divided by 2. The fields used in the calculation are engineering; physical sciences; earth, atmospheric, and ocean sciences; mathematics; computer science; biological/agricultural sciences; psychology; social sciences; and non-science and -engineering.

[3] This dissimilarity index is a measure of the percentage of master's degree recipients in a racial/ethnic group who would need to switch fields of study to match the field distribution of white students receiving master's degrees. The index is calculated as the sum of the absolute difference between the percentage of master's degree recipients in a particular racial/ethnic group earning master's degrees in each field and the percentage of their white counterparts earning master's degrees in each field divided by 2. The fields used in the calculation are engineering; physical sciences; earth, atmospheric, and ocean sciences; mathematics; computer science; biological/agricultural sciences; psychology; social sciences; and non-science and -engineering.

Text table 4-1.

**Percentage of all earned master's degrees that are in science and engineering, by citizenship and race/ethnicity of recipient: 1989 and 1996**

| Citizenship and race/ethnicity | 1989 | 1996 |
|---|---|---|
| Total, all recipients | 22.6 | 21.7 |
| U.S. citizens and permanent residents [1] | 19.8 | 18.9 |
| White, non-Hispanic | 19.1 | 18.3 |
| Asian/Pacific Islander | 40.3 | 34.4 |
| Black, non-Hispanic | 12.3 | 14.3 |
| Hispanic | 19.5 | 17.7 |
| American Indian/Alaskan Native | 19.3 | 18.0 |
| Unknown race/ethnicity | 23.5 | 20.3 |
| Nonresident aliens [2] | 47.1 | 42.7 |

[1] Racial/ethnic categories are as designated on the survey form. These categories include U.S. citizens and foreign citizens on permanent visas (i.e., resident aliens who have been admitted for permanent residency).

[2] Nonresident aliens include foreign citizens on temporary visas only. No racial/ethnic data are collected for this group.

**NOTE:** Data on race/ethnicity of degree recipients were collected on broad fields of study only until 1994; therefore, these trend data could not be adjusted to the exact field taxonomies used by NSF.

**SOURCE:** Tabulations by National Science Foundation/Division of Science Resources Studies; data from U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey.

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the field distribution of white master's degree recipients. The dissimilarity index was 2.9 for American Indian and 4.3 for black master's degree recipients.

The number of master's degrees in science and engineering awarded to all racial/ethnic groups increased in the 1990s. These gains occurred in degrees earned by both men and women. The percentages of master's degrees earned by Asians, blacks, and Hispanics increased from 1989 to 1996. (See figure 4-3.)

## Asians

Asians earned 5,942 master's degrees in science and engineering in 1996, up from 4,100 in 1989. By 1996, Asians accounted for 9 percent of all science and engineering master's degrees awarded, up from 7 percent in 1989. (See appendix table 4-6.) In contrast, they earned 4 percent of the master's degrees awarded in 1996 in non-science and -engineering fields.

Asians earned an increasing percentage of the master's degrees in each major science and engineering field during this time period. In 1996—as has been the case since 1989—the two fields in which Asians earned the largest proportions of science and engineering master's degrees were computer science and engineering.

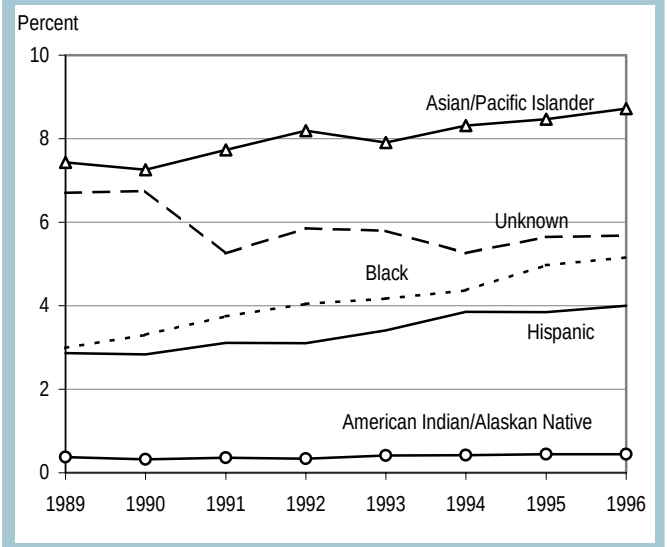
## Blacks

Blacks earned 3,518 science and engineering master's degrees in 1996 (5 percent of the total), up from 1,652 (3 percent) in 1989. (See appendix tables 4-4 and 4-6.) They earned 7 percent of the master's degrees in non-science and -engineering fields.

The percentage of master's degrees earned by blacks in each of the major science and engineering fields increased between 1989 and 1996, with the numbers of master's degrees earned by blacks in some fields more than doubling over the 7-year period. Thus, in mathematics, master's degrees awarded to blacks rose from 59 to 151; in the agricultural sciences, from 36 to 88; in the social sciences, from 407 to 965; and in psychology, from 395 to 947. Two fields—the social sciences and psychology—accounted for 54 percent of the science and engineering master's degrees earned by blacks. In comparison,

Figure 4-3.

**Percentage of master's degrees in science and engineering earned by minority groups, by race/ethnicity of U.S. citizens and permanent residents: 1989–96**




**SOURCE:** Tabulations by National Science Foundation/Division of Science Resources Studies; data from U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System Completions Survey.

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40 percent of the science and engineering master's degrees earned by all U.S. citizens and permanent residents were in these fields.

### *Hispanics*

Trends in master's degrees earned by Hispanics were similar to those for blacks. Hispanics earned 2,730 science and engineering master's degrees in 1996, 4 percent of the total earned by all U.S. citizens and permanent residents. (See appendix tables 4-4 and 4-6.) This was an increase from the 1,585 master's degrees (3 percent) earned by Hispanics in 1989. Hispanics earned 4 percent of the master's degrees awarded in non-science and -engineering fields in 1996.

The percentage of master's degrees earned by Hispanics in each of the major science and engineering fields increased between 1989 and 1996. As with blacks, the numbers of master's degrees earned by Hispanics more than doubled in some fields over the 7-year period. In mathematics, the number of master's degrees earned by Hispanics rose from 34 in 1989 to 91 in 1996; in psychology, the increase was from 360 to 709.

### *American Indians*

American Indians earned 304 master's degrees in science and engineering in 1996; this figure was up from 209 in 1989. (See appendix tables 4-4 and 4-6.) The overall percentage of science and engineering master's degrees earned by American Indians was unchanged, however, remaining at 0.4 percent. American Indians earned 0.5 percent of non-science and -engineering master's degrees in 1996.

The largest numbers of science and engineering degrees earned by American Indians were in the social sciences (97) and psychology (80). More than half (58 percent) of the science and engineering master's degrees earned by American Indians in 1996 were in these two fields, compared with 40 percent of the science and engineering master's degrees earned by all U.S. citizens and permanent residents.

### Minority women (U.S. citizens and permanent residents only)

The numbers of master's degrees in science and engineering awarded to women and to men in each racial/ethnic group increased during the 1989–96 period. (See appendix tables 4-7 and 4-8.) The increases during this time occurred in most major science and engineering fields, with the exceptions of computer science and the physical sciences. The numbers of master's degrees in computer science dropped for white men and women and for American Indian men, stayed the same for American Indian women, and increased for all other groups. The numbers of master's degrees in the physical sciences rose for women of all racial/ethnic groups, but dropped for all men except for blacks and Hispanics.

Women earned 41 percent of the master's degrees awarded in science and engineering to U.S. citizens and permanent residents in 1996. Blacks were the only racial/ethnic group in which women earned more than half of the master's degrees in science and engineering. Black women earned 56 percent of the master's degrees in science and engineering to blacks in 1996. (See figure 4-4.)

### Persons with disabilities

Data on master's degree awards to persons with disabilities are not collected by the Federal Government. The National Science Foundation does not collect data on master's degrees; the National Center for Education Statistics does collect data on the number of master's degrees but not by measures of disability status. As noted in the previous chapter, data on disabilities are frequently not included in comprehensive institutional records. Therefore, enrollment and degree data collected from colleges and universities are not reported by disability status.

## Doctorates

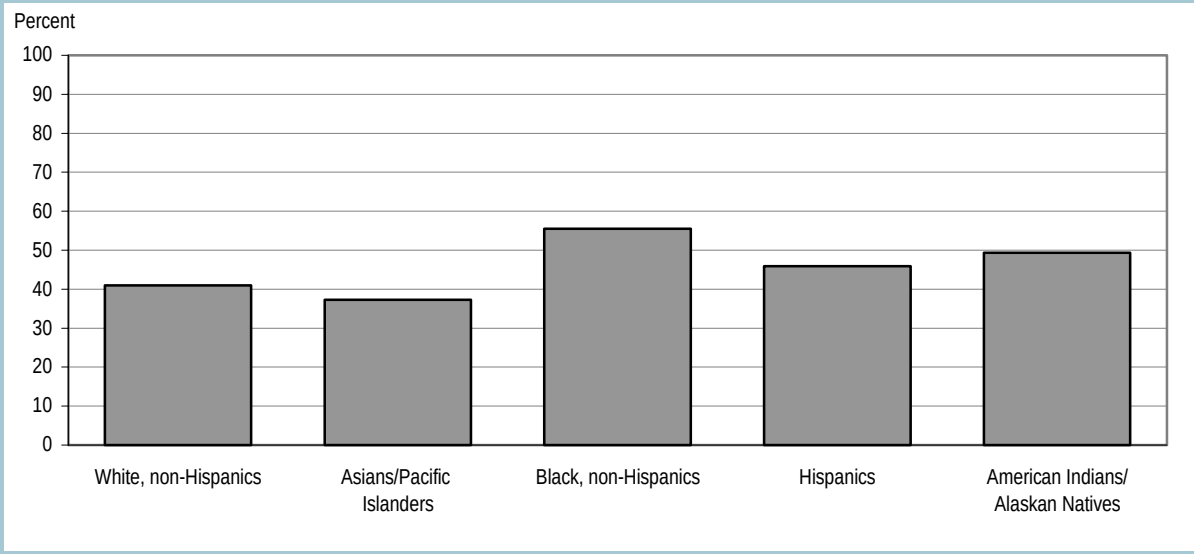
Awards in science and engineering accounted for 63 percent of all doctoral degrees in 1997. The number of doctoral degrees in science and engineering more than doubled between 1966 and 1997, rising from 11,570 to 26,847. (See appendix table 4-9.) Science and engineering doctorates rose sharply in the 1960s, stabilized in the 1970s, and rose again in the 1980s and early 1990s. In 1997, the number of science and engineering doctorates dropped for the first time since 1980.

### Women

In science and engineering fields, both the number of women earning doctoral degrees and their percentage of the total have risen steadily over the years. In 1966, women earned 924 or 8 percent of all science and engineering doctoral degrees awarded. (See appendix tables 4-10 and 4-11.) By 1997, they earned 8,796, or 33 percent. Men, on the other hand, accounted for all of the decline in the number of doctorates in the 1970s and for the decrease between 1996 and 1997. (See figure 4-5.)

Figure 4-4.

**Percentage of master's degrees in science and engineering earned by women, by race/ethnicity of U.S. citizens and permanent residents: 1996**




**SOURCE:** Tabulations by National Science Foundation/Division of Science Resources Studies; data from U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey.

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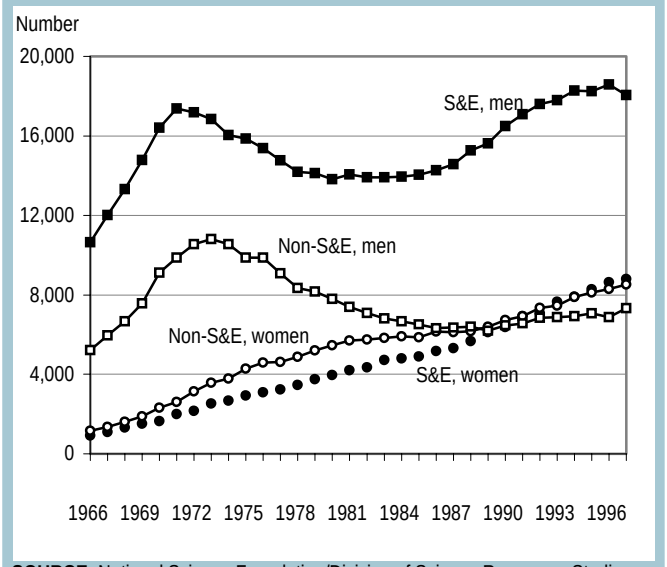
Figure 4-5.

**Doctoral degrees awarded in science and engineering (S&E) fields and in non-S&E fields, by sex: 1966–97**




**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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Women earn a smaller percentage of the doctoral degrees in science and engineering than they do of the doctoral degrees in other fields. In 1997, women earned 8,526 or 54 percent of the doctorates awarded in non-science and -engineering fields. (See appendix tables 4-10 and 4-11.)

By broad science and engineering field, women earned the highest percentage of doctoral degrees in psychology (67 percent), the biological/agricultural sciences (41 percent), and the social sciences (39 percent); they earned the lowest percentage of their doctoral degrees in engineering (12 percent) in 1997.[4] (See appendix table 4-11.)

Reductions in the doctorate field dissimilarity index over time indicate that the field distributions of male and female doctorate recipients are becoming more similar.[5] In 1966, the dissimilarity index was 26.1, indicating that 26.1 percent of women would have to switch their Ph.D. field to match the field distribution for male Ph.D. recipients. By 1996, the dissimilarity index was 17.4. (See appendix table 4-10 and figure 4-2.)

[4] See http://www.nsf.gov/sbe/srs/sengdr/start.htm for data on doctoral degrees by finer field and for the most recent data on doctoral degrees.

## Baccalaureate-origin Institutions for Female Recipients of Science and Engineering Doctorates

About two-thirds of all science and engineering doctorate recipients earned their baccalaureates at research universities (NSF 1996). Women, though, were less likely than men to have earned their baccalaureate degrees at research universities and more likely to have earned them at baccalaureate colleges. Notably, 5 of the top 50 baccalaureate-origin institutions for women were liberal arts colleges; 4 of the 5 were women's colleges. (See text table 4-2.)

## Minorities (U.S. citizens and permanent residents only)

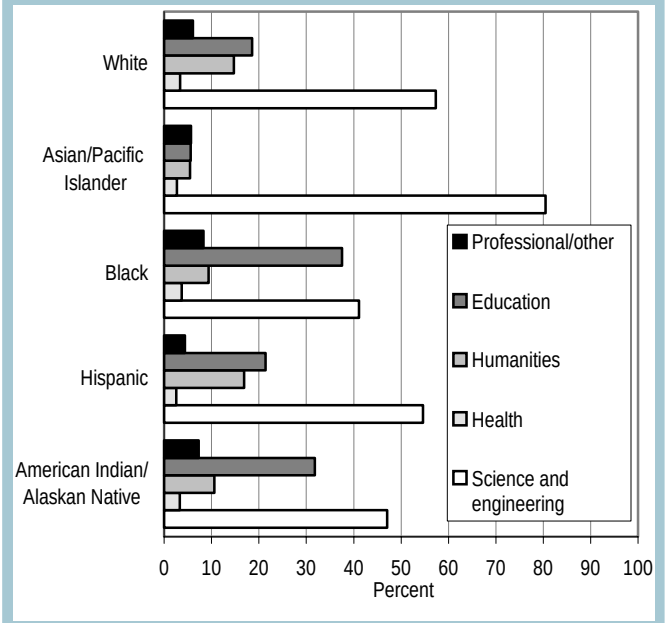
More than half (59 percent) of all doctorates awarded to U.S. citizens and permanent residents were earned in science and engineering fields in 1997. (See appendix table 4-12.) For two groups—blacks and American Indians—more than half of the doctorates earned in 1997 were in non-science and -engineering fields, primarily education. Specifically, 37 percent of the doctorates earned by blacks and 32 percent of those earned by American Indians were in education, compared with 18 percent earned by all U.S. citizens and permanent residents. (See figure 4-6.) In contrast, 80 percent of the doctorates earned by Asians were in science and engineering, and only 6 percent were in education in 1997.

A dissimilarity index was constructed to measure the amount of similarity or dissimilarity in the distributions of racial/ethnic groups by field of doctorate.[6] The dissimilarity index is highest for Asians: 31.3 percent of Asians would have to switch their doctoral field to match the distribution of white Ph.D. recipients. The index is lowest for Hispanics, 7.1 percent of whom would have to switch their field of doctorate to match the distribution for white Ph.D. recipients. The dissimilarity index was 17.4 for black and 13.7 for American Indian Ph.D. recipients. The indices were smaller in 1997 than in 1975 for all nonwhite racial/ethnic groups.

U.S. citizens and permanent residents earned 18,005 doctorates in science and engineering in 1997. Of these, 76 percent were earned by whites, 14 percent by Asians, 4 percent by Hispanics, 3 percent by blacks, and 0.4 percent by American Indians.[7] (See appendix table 4-13.) The number of doctoral degrees in science and engineering awarded to Asians, blacks, Hispanics, and American Indians rose between 1975 and 1997. (See appendix table 4-12 and figure 4-7.) For blacks, much of this growth

Figure 4-6.

**Percentage of doctoral degrees awarded in science and engineering (S&E) and in non-S&E fields, by race/ethnicity: 1997**




**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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[5] The dissimilarity index is a measure of the percentage of female doctorate recipients who would need to switch fields of study to match the field distribution of male doctorate recipients. The index is calculated as the sum of the absolute difference between the percentage of women doctorate recipients earning degrees in each field and the percentage of men doctorate recipients earning degrees in each field divided by 2. The fields used in the calculation are engineering; physical sciences; earth, atmospheric, and ocean sciences; mathematics; computer science; biological/agricultural sciences; psychology; social sciences; and non-science and -engineering.

[6] The dissimilarity index is a measure of the percentage of doctorate recipients in a racial/ethnic group who would need to switch fields of study to match the field distribution of white recipients of doctoral degrees. The index is calculated as the sum of the absolute difference between the percentage of degree recipients in a particular racial/ethnic group earning doctorates in each field and the percentage of white doctoral recipients earning degrees in each field divided by 2. The fields used in the calculation are engineering; physical sciences; earth, atmospheric, and ocean sciences; mathematics; computer science; biological/agricultural sciences; psychology; social sciences; and non-science and -engineering.

[7] An additional 3 percent were earned by people of unknown race/ethnicity.

Text table 4-2.

**Top 50 institutions that were baccalaureate origins of men and women 1997 science and engineering doctorate recipients**

| Rank | Men | | Women | |
|---|---|---|---|---|
| | Academic institutions | Number of doctorates | Academic institutions | Number of doctorates |
| | Total of all academic institutions | 18,051 | Total of all academic institutions | 8,796 |
| 1 | University of California-Berkeley | 217 | University of California-Berkeley | 109 |
| 2 | University of Illinois at Urbana-Champaign | 168 | University of Michigan at Ann Arbor | 88 |
| 3 | Massachusetts Institute of Technology | 143 | University of Illinois at Urbana-Champaign | 63 |
| 4 | Pennsylvania State University, Main Campus | 138 | University of California-Los Angeles | 60 |
| 5 | University of Wisconsin-Madison | 119 | Harvard University | 59 |
| 6 | University of Michigan at Ann Arbor | 112 | University of Wisconsin-Madison | 59 |
| 7 | University of Texas at Austin | 106 | University of California-Davis | 58 |
| 8 | University of California-Davis | 93 | Massachusetts Institute of Technology | 57 |
| 9 | Brigham Young University, Main Campus | 93 | University of Minnesota-Twin Cities | 56 |
| 10 | Purdue University, Main Campus | 92 | University of Texas at Austin | 54 |
| 11 | Stanford University | 91 | Duke University | 53 |
| 12 | University of California-Los Angeles | 89 | Pennsylvania State University, Main Campus | 53 |
| 13 | Harvard University | 89 | Stanford University | 51 |
| 14 | Princeton University | 86 | Brown University | 50 |
| 15 | Virginia Polytechnic Institute and State University | 86 | Yale University | 49 |
| 16 | University of Minnesota-Twin Cities | 84 | University of North Carolina at Chapel Hill | 46 |
| 17 | Ohio State University, Main Campus | 84 | University of Virginia, Main Campus | 46 |
| 18 | Texas A&M University Main Campus | 84 | University of Pennsylvania | 45 |
| 19 | University of Washington-Seattle | 79 | Rutgers the State University of New Jersey New Brunswick | 45 |
| 20 | California Institute of Technology | 74 | Texas A&M University Main Campus | 45 |
| 21 | University of California-San Diego | 73 | Ohio State University, Main Campus | 43 |
| 22 | University of Florida | 73 | Michigan State University | 42 |
| 23 | University of Colorado at Boulder | 71 | University of California-Irvine | 40 |
| 24 | Michigan State University | 71 | University of Chicago | 39 |
| 25 | Rutgers, the State University of New Jersey, New Brunswick | 68 | University of California-Santa Cruz | 38 |
| 26 | University of Arizona | 66 | Northwestern University | 38 |
| 27 | University of Chicago | 61 | Purdue University, Main Campus | 37 |
| 28 | Iowa State University | 61 | University of Florida | 36 |
| 29 | University of Virginia, Main Campus | 61 | University of Washington-Seattle | 36 |
| 30 | Georgia Institute of Technology, Main Campus | 60 | Wellesley College | 34 |
| 31 | University of Maryland at College Park | 60 | Princeton University | 34 |
| 32 | Rensselaer Polytechnic Institute | 60 | University of California-San Diego | 32 |
| 33 | University of Massachusetts at Amherst | 59 | University of Colorado at Boulder | 32 |
| 34 | State University of New York at Buffalo | 57 | University of Iowa | 32 |
| 35 | Duke University | 57 | Indiana University at Bloomington | 30 |
| 36 | University of Pennsylvania | 57 | Smith College | 30 |
| 37 | North Carolina State University at Raleigh | 55 | Bryn Mawr College | 30 |
| 38 | Brown University | 55 | University of Arizona | 27 |
| 39 | Yale University | 53 | University of Massachusetts at Amherst | 27 |
| 40 | University of Notre Dame | 51 | Miami University, All Campuses | 27 |
| 41 | University of California-Santa Barbara | 50 | Virginia Polytechnic Institute and State University | 26 |
| 42 | University of California-Irvine | 47 | Johns Hopkins University | 25 |
| 43 | Northwestern University | 47 | University of California-Santa Barbara | 24 |
| 44 | Washington University | 46 | Emory University | 24 |
| 45 | Carnegie Mellon University | 46 | Iowa State University | 24 |
| 46 | University of California-Santa Cruz | 45 | New York University | 24 |
| 47 | University of Rochester | 45 | University of Puerto Rico Mayaguez Campus | 24 |
| 48 | Johns Hopkins University | 44 | Mount Holyoke College | 23 |
| 49 | University of Tennessee at Knoxville | 44 | State University of New York at Buffalo | 23 |
| 50 | Indiana University at Bloomington | 43 | Swarthmore College | 23 |
| | | | College of William and Mary | 23 |

**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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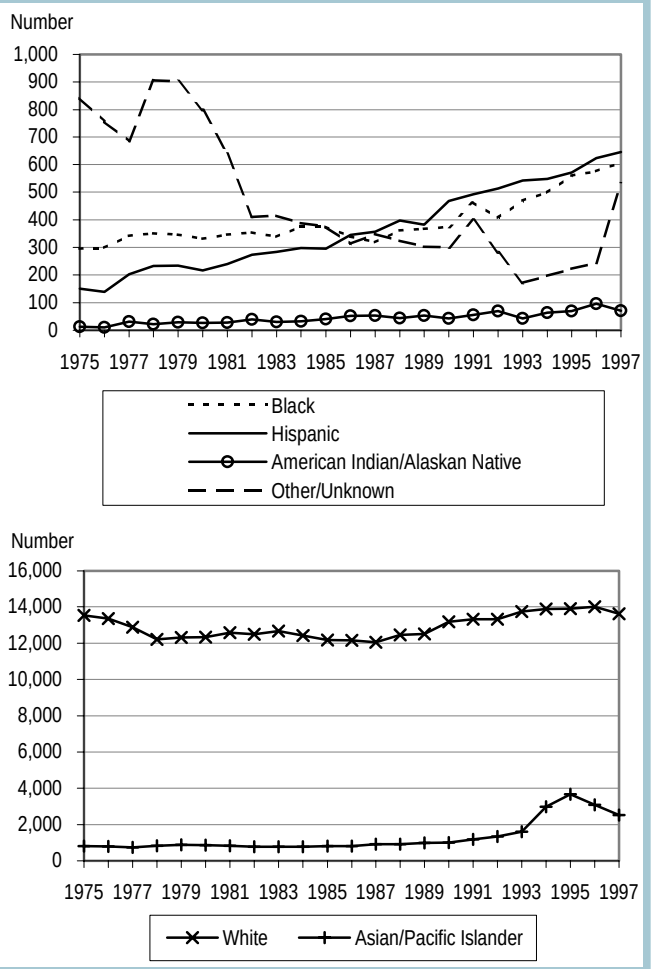
Figure 4-7.
**Doctoral degrees in science and engineering, by race/ethnicity of U.S. citizens and permanent residents: 1975-97**




**NOTE:** The higher numbers of Asians in the late 1990s is partly a result of the Chinese Student Protection Act of 1992 which made thousands of Chinese in the United States eligible to apply for pernanent residency.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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occurred in the 1990s. The number of doctoral degrees in science and engineering awarded to whites fluctuated between 12,000 and 14,000 from 1975 through 1997.

## Asians

Asians earned 14 percent of the science and engineering doctorates awarded to U.S. citizens and permanent residents in 1997; this was up from 5 percent in 1975. (See appendix table 4-12.) Asians earned, in contrast, only 5 percent of the doctorates awarded that year in non-science and -engineering fields. The number of doctoral degrees in science and engineering earned by U.S. citizen or permanent resident Asians spiked in 1994 and 1995 as a result of changes in immigration policy. (See sidebar on following page.) Although the numbers of these doctorate-holders dropped in 1996 and 1997, they were still well above the 1993 total.

Asians constituted about one-fifth of engineering and computer science doctorate recipients in 1997 and about one-sixth of the doctorate recipients in the physical sciences, mathematics, and biological sciences. They receive relatively small percentages of the doctorates awarded in psychology (4 percent) and the social sciences (8 percent). (See appendix table 4-12.)

## The Chinese Student Protection Act

The Chinese Student Protection Act of 1992 made thousands of students from the People's Republic of China who were enrolled in U.S. universities in 1989 at the time of the Tiananmen incident eligible to apply for permanent residency in 1993. The number of these students who had permanent visas at the time of science and engineering Ph.D. conferral rose from 162 (or 8 percent of all science and engineering students from China) in 1992 to 2,169 (79 percent) in 1995. The percentage holding permanent visas dropped in 1996 and 1997 as the number of students eligible for permanent residency under the act declined. (See text table 4-3.)

Text table 4-3.
**Number and percentage of science and engineering doctorate recipients from the People's Republic of China, by type of visa: 1990–97**

| Year | Total | | Permanent visas | | Temporary visas | |
|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent |
| 1990 | 1,150 | 100.0 | 54 | 4.7 | 1,096 | 95.3 |
| 1991 | 1,793 | 100.0 | 100 | 5.6 | 1,693 | 94.4 |
| 1992 | 2,045 | 100.0 | 162 | 7.9 | 1,883 | 92.1 |
| 1993 | 2,227 | 100.0 | 352 | 15.8 | 1,875 | 84.2 |
| 1994 | 2,531 | 100.0 | 1,642 | 64.9 | 889 | 35.1 |
| 1995 | 2,752 | 100.0 | 2,169 | 78.8 | 583 | 21.2 |
| 1996 [1] | 2,953 | 100.0 | 1,628 | 55.1 | 1,324 | 44.8 |
| 1997 | 2,223 | 100.0 | 949 | 42.7 | 1,274 | 57.3 |

[1] Total includes one person of unknown visa type.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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### Blacks

The number of science and engineering doctorates awarded to blacks remained fairly constant from 1975 to 1990—approximately 300 to 375 degrees per year—but rose in the 1990s, reaching 607 in 1997. (See appendix table 4-12.) Blacks accounted for 3 percent of all science and engineering doctorate recipients in 1997, up from 2 percent in 1975. In contrast, they received 7 percent of the doctorates in non-science and -engineering fields in 1997.

Fewer than half of all doctoral degrees earned by blacks were in science and engineering. Blacks earned almost as many doctoral degrees in education (553) as they did in science and engineering in 1997. Half of the science and engineering doctorates earned by blacks in 1997 were in psychology and the social sciences, compared with 32 percent of those earned by all U.S. citizens and permanent residents. (See appendix table 4-13.)

### Hispanics

Hispanics earned 151 of the science and engineering Ph.D.s awarded in 1975 and 645 of those awarded in 1997. (See appendix table 4-12.) They comprised 4 percent of the science and engineering doctorate recipients in 1997, up from just 1 percent in 1975. Hispanics also accounted for 4 percent of the doctorate recipients in non-science and -engineering fields in 1997.

About one-fourth (27 percent) of the science and engineering doctorates earned by Hispanics in 1997 were awarded to Puerto Ricans; another one-fourth (24 percent) were awarded to Mexican Americans. (See appendix table 4-13.)

Fifty-five percent of all doctorates earned by Hispanics in 1997 were in science and engineering fields. More than one-fourth (26 percent) of these were in psychology; in contrast, 17 percent of the science and engineering doctorates earned by all U.S. citizens and permanent residents were in this field.

### American Indians

The number of science and engineering doctorates earned by American Indians increased from 13 in 1975 to 96 in 1996, but dropped to 71 in 1997. (See appendix table 4-12.) American Indians earned 0.4 percent of the science and engineering doctorates awarded to U.S. citizens and permanent residents in 1997, up from 0.1 percent in 1975. They earned 0.6 percent of non-science and -engineering doctorates in 1997.

Forty-six percent of the science and engineering doctorates earned by American Indians in 1997 were in psychology and the social sciences in 1997, compared with 32 percent of those earned by all U.S. citizens and permanent residents.

## Minority women

The numbers of doctoral degrees in science and engineering awarded to women and men in almost every racial/ethnic group increased from 1975 to 1997, with the single exception of white men. (See appendix tables 4-14 and 4-15.) The numbers of doctorates granted to women in each racial/ethnic group more than doubled in this time period: from 2,347 to 5,180 for white women, 71 to 280 for black women, 108 to 896 for Asian women, 16 to 262 for Hispanic women, and 3 to 31 for American Indian women.

The proportions of doctoral degrees granted in science and engineering to women in each racial/ethnic group also increased from 1975 to 1997. (See text table 4-4.) Asian, black, Hispanic, and American Indian women accounted for less than 1 percent of U.S. citizen and permanent resident doctorate recipients in 1975. In 1997, in contrast, Asian women received 5 percent, black women 1.6 percent, Hispanic women 1.5 percent, and American Indian women 0.2 percent of science and engineering doctorate recipients.

In 1997, women earned fewer than half of the science and engineering doctorates in every racial/ethnic group. Specifically, women earned 46 percent of science and engineering doctorates among blacks and 44 percent, 41 percent, 38 percent, and 35 percent among American Indians, Hispanics, whites, and Asians, respectively. (See appendix tables 4-14 and 4-15.)

Text table 4-4.

**Number and percentage of doctoral degrees in science and engineering, by sex and race/ethnicity of U.S. citizens and permanent residents: 1975 and 1997**

| Race/ethnicity | 1975 | | | | | | 1997 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Both sexes | | Women | | Men | | Both sexes | | Women | | Men | |
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Total, U.S. citizens and permanent residents | 15,641 | 100.0 | 2,651 | 16.9 | 12,990 | 83.1 | 18,005 | 100.0 | 6,814 | 37.8 | 11,191 | 62.2 |
| White, non-Hispanic | 13,526 | 86.5 | 2,347 | 15.0 | 11,179 | 71.5 | 13,623 | 75.7 | 5,180 | 28.8 | 8,443 | 46.9 |
| Asian/Pacific Islander | 814 | 5.2 | 108 | 0.7 | 706 | 4.5 | 2,527 | 14.0 | 896 | 5.0 | 1,631 | 9.1 |
| Black, non-Hispanic | 295 | 1.9 | 71 | 0.5 | 224 | 1.4 | 607 | 3.4 | 280 | 1.6 | 327 | 1.8 |
| Hispanic | 151 | 1.0 | 16 | 0.1 | 135 | 0.9 | 645 | 3.6 | 262 | 1.5 | 383 | 2.1 |
| American Indian/Alaskan Native | 13 | 0.1 | 3 | 0.0 | 10 | 0.1 | 71 | 0.4 | 31 | 0.2 | 40 | 0.2 |
| Other/unknown race/ethnicity | 842 | 5.4 | 106 | 0.7 | 736 | 4.7 | 532 | 3.0 | 165 | 0.9 | 367 | 2.0 |

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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## Baccalaureate-origin Institutions for Minority Recipients of Science and Engineering Doctorates

Even as they do in the undergraduate education of black students in science and engineering, Historically Black Colleges and Universities (HBCUs) play an important role in educating blacks who go on to earn doctorates in these fields. Twenty of the top 50 baccalaureate-origin institutions of 1993–97 black doctorate recipients were HBCUs. (See text table 4-5.)

The baccalaureate-origin institutions of Hispanic and American Indian doctorate recipients reflect to some degree the geographic concentration of their populations. Twenty-six of the top 50 baccalaureate-origin institutions of Hispanic doctorate recipients are in Puerto Rico, California, Florida, and Texas. Six of the 27 institutions that were baccalaureate-origin institutions of three or more American Indian doctorate recipients are in California and Oklahoma.

Research I universities also play a large role in the undergraduate education of minority science and engineering doctorate recipients. More than 20 of the top 50 baccalaureate-origin institutions for each racial/ethnic group were Research I universities. White and Asian science and engineering doctorate recipients, however, were the most likely to have earned bachelor's degrees in such universities—more than 40 of the top 50 baccalaureate-origin institutions were Research I institutions.

## Persons with disabilities

The number of science and engineering doctorates earned by persons with disabilities was 318 in 1997, or about 1 percent of the total number of science and engineering doctoral degrees awarded. The percentage of science and engineering doctorate recipients with disabilities has not changed appreciably since 1989. (See appendix table 4-16.)

Higher proportions of doctorate recipients with disabilities than of those without disabilities earned their doctorates in psychology and the social sciences; lower proportions earned their doctorates in the physical sciences, biological sciences, and engineering. (See appendix table 4-17 and figure 4-8.)

## Postgraduation plans and postdoctoral fellowships[8]

About two-thirds of U.S. citizen and permanent resident science and engineering doctorate recipients in 1997 had definite postgraduation plans at the time they received their doctorate, and 61 percent had definite plans to remain in the United States. Of these last, 36 percent planned to pursue postdoctoral study. (See appendix table 4-18.)

[8] The data presented here apply to U.S. citizens and permanent residents only.

Text table 4-5.

**Top 50 institutions that were baccalaureate origins of 1993–97 science and engineering doctorate recipients, by race/ethnicity**



| Rank | Black, non-Hispanic | | White, non-Hispanic | | Hispanic | |
|---|---|---|---|---|---|---|
| | Academic institution | Number of doctorates | Academic institution | Number of doctorates | Academic institution | Number of doctorates |
| 1 | Howard University | 101 | University of California-Berkeley | 1,080 | University of Puerto Rico-Rio Piedras | 223 |
| 2 | Spelman College | 44 | University of Illinois at Urbana-Champaign | 991 | University of Puerto Rico-Mayaguez | 115 |
| 3 | Massachusetts Institute of Technology | 27 | University of Michigan at Ann Arbor | 889 | University of California-Berkeley | 64 |
| 4 | University of Maryland at College Park | 26 | University of Wisconsin-Madison | 841 | University of California-Los Angeles | 57 |
| 5 | Tuskegee University | 24 | Pennsylvania State University, Main Campus | 804 | University of Texas at Austin | 46 |
| 6 | Morehouse College | 24 | Cornell University, All Campuses | 739 | University of Miami | 44 |
| 7 | Wayne State University | 24 | Massachusetts Institute of Technology | 719 | University of Texas at El Paso | 38 |
| 8 | Hampton University | 24 | University of Texas at Austin | 620 | Massachusetts Institute of Technology | 37 |
| 9 | University of Michigan at Ann Arbor | 24 | University of Minnesota-Twin Cities | 617 | University of California-Irvine | 31 |
| 10 | Southern University A&M College at Baton Rouge | 24 | Harvard University | 577 | Cornell University, All Campuses | 31 |
| 11 | North Carolina Agricultural & Technical State University | 23 | Ohio State University, Main Campus | 568 | University of Florida | 28 |
| 12 | Michigan State University | 22 | Michigan State University | 564 | Stanford University | 27 |
| 13 | Alabama Agricultural and Mechanical University | 21 | University of California-Davis | 557 | University of New Mexico, All Campuses | 26 |
| 14 | University of California-Berkeley | 21 | Texas A&M University Main Campus | 556 | University of California-San Diego | 25 |
| 15 | North Carolina State University at Raleigh | 21 | University of California-Los Angeles | 554 | Texas A&M University, Main Campus | 25 |
| 16 | Lincoln University (Pennsylvania) | 21 | Purdue University, Main Campus | 540 | University of California-Davis | 22 |
| 17 | Northwestern University | 19 | Rutgers-New Brunswick | 504 | Florida International University | 22 |
| 18 | Harvard University | 19 | Brigham Young University, Main Campus | 490 | San Diego State University | 21 |
| 19 | Jackson State University | 19 | Virginia Polytechnic Institute and State University | 472 | New Mexico State University, All Campuses | 21 |
| 20 | Princeton University | 19 | Princeton University | 469 | University of Michigan at Ann Arbor | 21 |
| 21 | Florida Agricultural and Mechanical University | 18 | University of California-San Diego | 467 | Harvard University | 19 |
| 22 | Tougaloo College | 18 | University of Washington-Seattle | 467 | The Pontifical Catholic University of Puerto Rico | 19 |
| 23 | City University of New York City College | 18 | University of Colorado at Boulder | 455 | Rutgers-New Brunswick | 19 |
| 24 | Brown University | 18 | University of Pennsylvania | 447 | University of California-Santa Barbara | 18 |
| 25 | Fisk University | 16 | Stanford University | 445 | University of Maryland at College Park | 18 |
| 26 | North Carolina Central University | 15 | University of Florida | 429 | New York University | 17 |
| 27 | Tennessee State University | 15 | Yale University | 427 | Georgia Institute of Technology, Main Campus | 15 |
| 28 | Morgan State University | 14 | Iowa State University | 421 | University of Arizona | 14 |
| 29 | City University of New York Brooklyn College | 14 | University of Maryland at College Park | 413 | California State University-Northridge | 14 |
| 30 | University of North Carolina at Chapel Hill | 14 | Brown University | 394 | University of Illinois at Urbana-Champaign | 14 |
| 31 | University of South Carolina at Columbia | 14 | University of Virginia, Main Campus | 388 | University of Houston | 14 |
| 32 | University of the District of Columbia | 14 | Duke University | 381 | California State University-Los Angeles | 13 |
| 33 | University of California-Los Angeles | 13 | University of California-Santa Cruz | 374 | Fordham University | 13 |
| 34 | Yale University | 13 | University of Chicago | 370 | University of Pennsylvania | 13 |
| 35 | University of Florida | 13 | University of Massachusetts at Amherst | 369 | Inter American University of Puerto Rico-San German | 13 |
| 36 | Clark Atlanta University | 13 | University of California-Santa Barbara | 365 | California State University-Long Beach | 12 |
| 37 | State University of New York at Buffalo | 13 | State University of New York at Buffalo | 353 | University of Southern California | 12 |
| 38 | Cornell University, All Campuses | 13 | Indiana University at Bloomington | 336 | University of South Florida | 12 |
| 39 | City University of New York Hunter College | 12 | University of North Carolina at Chapel Hill | 328 | Louisiana State University | 12 |
| 40 | Columbia University in the City of New York | 12 | Rensselaer Polytechnic Institute | 316 | Princeton University | 12 |
| 41 | University of Alabama | 11 | North Carolina State University at Raleigh | 316 | Duke University | 12 |
| 42 | Grambling State University | 11 | University of Iowa | 304 | University of Texas-Pan American | 12 |
| 43 | Xavier University of Louisiana | 11 | University of Arizona | 303 | University of Colorado at Boulder | 11 |
| 44 | New York University | 11 | University of Delaware | 300 | Yale University | 11 |
| 45 | University of Pennsylvania | 11 | Rice University | 293 | University of Chicago | 11 |
| 46 | Ohio State University, Main Campus | 11 | University of California-Irvine | 291 | Michigan State University | 11 |
| 47 | Stanford University | 10 | University of Rochester | 285 | University of California-Riverside | 10 |
| 48 | Georgia State University | 10 | University of Notre Dame | 284 | Tulane University | 10 |
| 49 | University of Illinois at Urbana-Champaign | 10 | Northwestern University | 274 | Johns Hopkins University | 10 |
| 50 | Boston University | 10 | Washington University | 272 | Brown University | 10 |

See explanatory information and SOURCES at end of table.

Text table 4-5.

**Top 50 institutions that were baccalaureate origins of 1993–97 science and engineering doctorate recipients, by race/ethnicity**



| | Asian/Pacific Islander | | American Indian/Alaskan Native | |
|---|---|---|---|---|
| Rank | Academic institution | Number of doctorates | Academic institution | Number of doctorates |
| 1 | University of California-Berkeley | 353 | University of Oklahoma, Norman Campus | 10 |
| 2 | Massachusetts Institute of Technology | 142 | University of California-Berkeley | 8 |
| 3 | University of California-Los Angeles | 132 | Oklahoma State University, All Campuses | 7 |
| 4 | Harvard University | 91 | Auburn University, Main Campus | 4 |
| 5 | California Institute of Technology | 80 | University of Arkansas, Main Campus | 4 |
| 6 | Stanford University | 75 | University of Arizona | 3 |
| 7 | University of Hawaii at Manoa | 72 | University of California-Irvine | 3 |
| 8 | University of California-Davis | 69 | University of California-Santa Barbara | 3 |
| 9 | Cornell University, All Campuses | 69 | Colorado State University | 3 |
| 10 | University of Michigan at Ann Arbor | 65 | University of Colorado at Boulder | 3 |
| 11 | Princeton University | 63 | University of Delaware | 3 |
| 12 | University of Illinois at Urbana-Champaign | 59 | University of Illinois at Urbana-Champaign | 3 |
| 13 | University of California-Irvine | 55 | Iowa State University | 3 |
| 14 | University of Maryland at College Park | 50 | Tufts University | 3 |
| 15 | University of Washington-Seattle | 48 | Michigan State University | 3 |
| 16 | Johns Hopkins University | 43 | Southwest Missouri State University | 3 |
| 17 | University of California-San Diego | 42 | University of Missouri, Columbia | 3 |
| 18 | University of Texas at Austin | 41 | University of Montana | 3 |
| 19 | Yale University | 39 | University of North Carolina at Chapel Hill | 3 |
| 20 | University of Chicago | 38 | University of North Carolina at Charlotte | 3 |
| 21 | Northwestern University | 37 | University of Central Oklahoma | 3 |
| 22 | University of Pennsylvania | 36 | Northeastern State University | 3 |
| 23 | University of Southern California | 34 | University of Texas at Austin | 3 |
| 24 | Purdue University, Main Campus | 32 | Central Washington University | 3 |
| 25 | Columbia University in the City of New York | 32 | University of Wisconsin-Madison | 3 |
| 26 | Brown University | 29 | University of Wisconsin-Milwaukee | 3 |
| 27 | University of Minnesota-Twin Cities | 29 | University of Virginia, Main Campus | 3 |
| 28 | Rutgers-New Brunswick | 29 | California Institute of Technology | 2 |
| 29 | University of Wisconsin-Madison | 28 | California State University-Fullerton | 2 |
| 30 | State Univ. of New York at Stony Brook, All Campuses | 28 | San Diego State University | 2 |
| 31 | University of California-Santa Barbara | 27 | University of California-Davis | 2 |
| 32 | Pennsylvania State U, Main Campus | 24 | University of California-Los Angeles | 2 |
| 33 | Texas A&M University, Main Campus | 24 | University of California-San Diego | 2 |
| 34 | University of California-Santa Cruz | 23 | University of California-Santa Cruz | 2 |
| 35 | Carnegie Mellon University | 23 | Florida Atlantic University | 2 |
| 36 | California State University-Long Beach | 22 | Jacksonville University | 2 |
| 37 | Washington University | 22 | University of Florida | 2 |
| 38 | Harvey Mudd College | 20 | Emory University | 2 |
| 39 | University of Colorado at Boulder | 19 | Loyola University of Chicago | 2 |
| 40 | Rensselaer Polytechnic Institute | 19 | University of Kansas, Main Campus | 2 |
| 41 | State University of New York at Buffalo | 19 | McNeese State University | 2 |
| 42 | Georgia Institute of Technology, Main Campus | 18 | Boston University | 2 |
| 43 | University of Rochester | 18 | Harvard University | 2 |
| 44 | Case Western Reserve University | 17 | Massachusetts Institute of Technology | 2 |
| 45 | New York University | 16 | University of New Mexico, All Campuses | 2 |
| 46 | Duke University | 16 | State University of New York at Albany | 2 |
| 47 | Ohio State University, Main Campus | 16 | University of Tulsa | 2 |
| 48 | San Francisco State University | 15 | Shippensburg University of Pennsylvania | 2 |
| 49 | San Jose State University | 15 | Swarthmore College | 2 |
| 50 | Wellesley College | 15 | University of Pennsylvania | 2 |

**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

## Financial Support in Graduate School

Students typically rely on more than one means of financial support in graduate school. Among 1995 science and engineering doctorate recipients, 86 percent reported using two or more means of financial support in graduate school (NSF 2000). Men and women and the various racial/ethnic groups tended to rely on different combinations of these means of financial support.

**Sex.** Although the three most prevalent combinations of support for male and female science and engineering doctorate recipients (research assistantship plus teaching assistantship, research assistantship plus own funds, and research assistantship plus teaching assistantship plus own funds) were identical in 1995, own funds and research assistantships were the fourth and fifth most frequently reported modes for women, compared to research assistantships and teaching assistantships plus own funds for men. The top five support modes for women accounted for 31 percent of doctorate recipients; the men's top five accounted for 44 percent. (See text table 4-6.)

Differences in field of doctorate account for some, but not all, of these differences. In many fields (for example, the social sciences, psychology, computer and information sciences, physical sciences, biological sciences, and engineering), the combinations of means of financial support were similar. In some fields, however, the combinations differ. For example, in mathematics, the most frequent combination for men was a research assistantship plus a teaching assistantship, while for women it was a teaching assistantship and own funds. In the earth, atmospheric, and ocean sciences, women and men shared the same top four combinations, but the most frequent combination for women was research assistantship plus teaching assistantship plus own funds, while for men it was research assistantship plus own funds.

**Race/ethnicity of U.S. citizens and permanent residents.** Support patterns in graduate school vary considerably by race/ethnicity. (See text table 4-7.) For U.S. citizen and permanent resident white and underrepresented minority (that is, non-Hispanic black, Hispanic, and American Indian) doctorate recipients, research assistantship plus own funds was the most frequently used means of support in graduate school. For U.S. citizen and permanent resident Asians, the combination of research assistantship plus teaching assistantship was the most frequently used means of support. Each of the top five combinations of modes of support for underrepresented minorities involves using their own resources; no other group shows such extensive reliance on own funds in their top five combinations of support modes.

Field of study differences are related to differences in financial support. Asians were more likely than other groups to receive their doctorates in engineering, the biological sciences, and the physical sciences—fields in which reliance on research assistantships is prevalent. Underrepresented minorities were more likely than other groups to receive their doctorates in the social sciences and psychology—fields in which reliance on own funds is prevalent. But within each major field of study, a larger percentage of both underrepresented minorities and whites reported using their own funds and loans than did Asians. One factor in this disparity might be the Chinese Student Protection Act of 1992: A large proportion of the U.S. citizen and permanent resident Asians receiving science and engineering Ph.D.s in 1995 were likely Chinese who may have entered graduate school as temporary residents and were therefore ineligible for many Federal loan programs that require U.S. citizenship or permanent residency.

Text table 4-6.
**Top five combinations of financial support of doctorate recipients, by sex: 1995**

| Sex and combinations of financial support | Number of doctorates | Percent of total |
|---|---|---|
| Women | | |
| Research assistantship + teaching assistantship | 617 | 7.2 |
| Research assistantship + own funds | 594 | 6.9 |
| Research assistantship + teaching assistantship + own funds | 571 | 6.7 |
| Own funds | 462 | 5.4 |
| Research assistantship | 436 | 5.1 |
| Men | | |
| Research assistantship + teaching assistantship | 2,086 | 11.9 |
| Research assistantship + own funds | 1,944 | 11.1 |
| Research assistantship + teaching assistantship + own funds | 1,432 | 8.2 |
| Research assistantship | 1,331 | 7.6 |
| Teaching assistantship + own funds | 842 | 4.8 |

**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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Text table 4-7.
**Top five combinations of financial support of doctorate recipients, by race/ethnicity: 1995**

| Race/ethnicity and combinations of financial support | Number of doctorates | Percent of total |
|---|---|---|
| White | | |
| Research assistantship + own funds | 1,057 | 7.5 |
| Research assistantship + teaching assistantship + own funds | 966 | 6.8 |
| Research assistantship + teaching assistantship | 860 | 6.1 |
| Own funds | 746 | 5.3 |
| Research assistantship + teaching assistantship + own funds + loan | 670 | 4.7 |
| Asian/Pacific Islander | | |
| Research assistantship + teaching assistantship | 797 | 21.8 |
| Research assistantship | 605 | 16.5 |
| Research assistantship + own funds | 359 | 9.8 |
| Research assistantship + teaching assistantship + own funds | 300 | 8.2 |
| Teaching assistantship + own funds | 123 | 3.4 |
| Underrepresented minority[1] | | |
| Research assistantship + own funds | 64 | 5.2 |
| Own funds + loan | 62 | 5.0 |
| Own funds + other | 55 | 4.5 |
| Own funds | 48 | 3.9 |
| Teaching assistantship + own funds | 47 | 3.8 |

[1] " Underrepresented minority" includes non-Hispanic blacks, Hispanics, and American Indians/Alaskan Natives.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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## Women

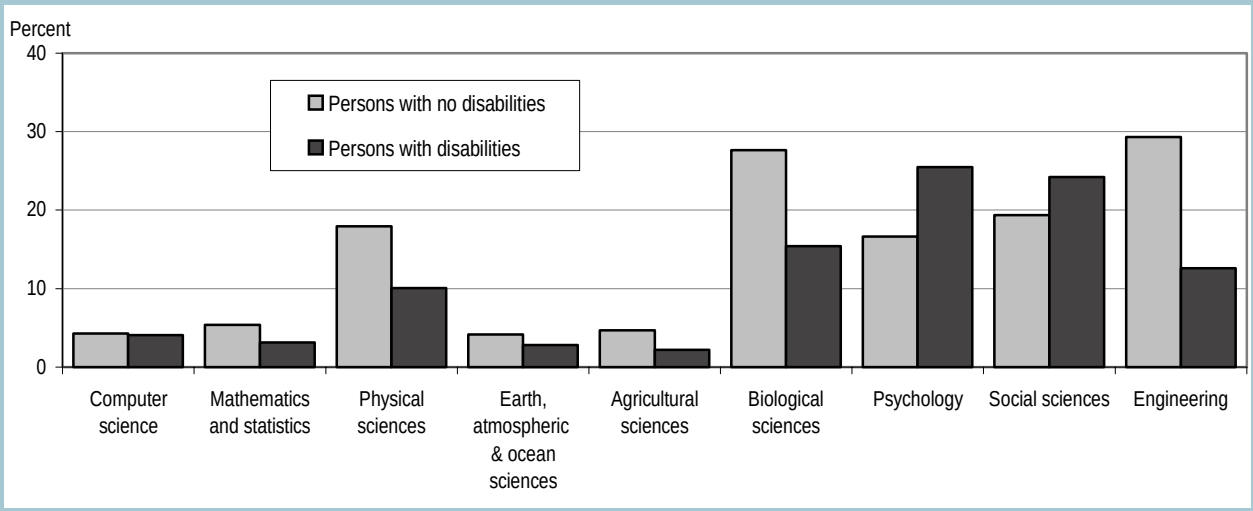
Among all U.S. citizen and permanent resident science and engineering doctoral recipients in 1997 who had definite postgraduation plans, women were more likely than men to have plans for postdoctoral study (39 percent versus 34 percent) or for academic employment (23 percent versus 17 percent). On the other hand, they were less likely than men to have plans for employment in industry (14 percent versus 25 percent). These general findings vary somewhat by field, however. Thus, within some fields (physical sciences, biological sciences, agricultural sciences, psychology, social sciences) men's and women's postgraduation plans were similar. For example, within the physical sciences, 28 percent of both men and women planned industrial employment. Within other fields, differences remain. In mathematics, for example, 43 percent of women and 36 percent of men planned academic employment.

The number of postdoctoral fellows—of either sex—in science and engineering steadily increased from 1979 to 1997. (See appendix table 4-19.) During this period, the proportion of postdoctorates held by women rose from 19 percent to 29 percent. Women accounted for a smaller percentage of postdoctoral fellows than of doctorate recipients (33 percent) in 1997, particularly in mathematics and psychology. (See figure 4-9.)

## Minorities

Black and American Indian U.S. citizen and permanent resident science and engineering doctorate recipients in 1997 were less likely than members of other racial/ethnic groups to have definite plans for postdoctoral study. Among those with plans for employment, a higher percentage of blacks and American Indians than of whites and Asians had definite plans for academic employment, while a lower percentage had definite plans for industrial employment. (See appendix table 4-20.) These patterns are related to differences in degree field—those with degrees in the social sciences and psychology are less likely than those whose degrees were in other fields to take postdoctoral appointments and are more likely to choose academic employment.

Figure 4-8.
**Percentage distribution of doctoral degrees in science and engineering, by disability status and field: 1997**




**SOURCE:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

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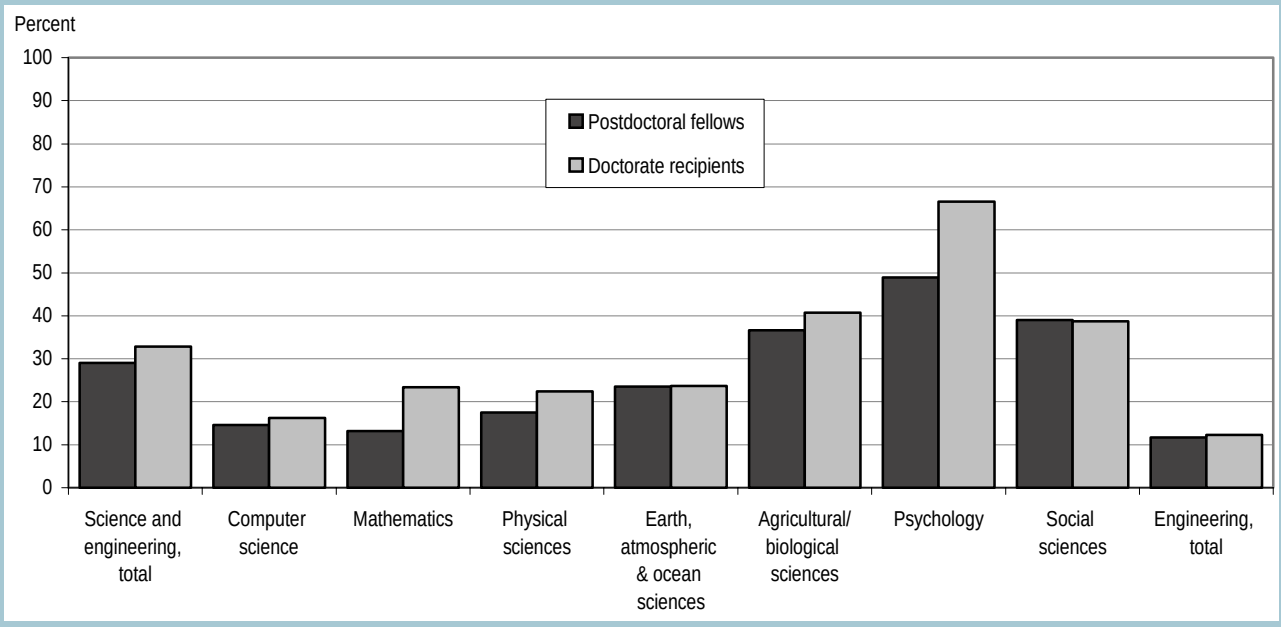
Figure 4-9.
**Women as a percentage of science and engineering postdoctoral fellows and of doctorate recipients, by field: 1997**




**SOURCES:** National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates and Survey of Graduate Students and Postdoctorates in Science and Engineering.

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## Persons with disabilities

Persons with disabilities were less likely than those with no disabilities among the 1997 cohort of U.S. citizen and permanent resident science and engineering doctoral recipients to have plans for postdoctoral study (28 percent versus 36 percent) and for industrial employment (18 percent versus 21 percent). (See appendix table 4-21.) Persons with disabilities were more likely than those without to have plans for academic employment (23 percent versus 19 percent) and employment in "other" sectors (22 percent versus 16 percent). These patterns are, again, related to differences in degree field (as was the case for women and minorities). Higher percentages of doctorate recipients with disabilities than without disabilities earned their doctorates in psychology and the social sciences, fields in which fewer recipients pursue postdoctoral study; lower percentages earned their doctorates in the physical and biological sciences, which are fields in which postdoctoral study is prevalent.

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